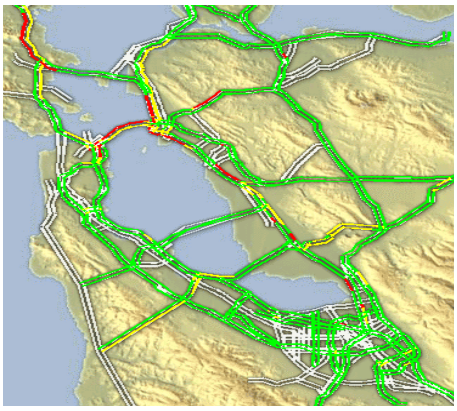
Traffic Impact Analysis:
Effects of the absence of BART service on major East Bay corridors



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October 11, 2004

1 Introduction

This document summarizes the data, analysis and conclusions from the traffic impact analysis of the absence of BART service on travel times on major East Bay Corridors. In particular, the objective of this study is to estimate how much longer people would spend commuting during peak hours under the scenario of no transbay BART service.

The main conclusion is that the queues originating at Bay Area bridges will spill back to most of the East Bay and San Francisco street networks. This will likely cause a complete gridlock on city streets with speeds as low as 2 or 3 m.p.h. In such a chaotic situation, it is likely that drivers will spend 1 or 2 hours to get on the closest freeway and then spend an extra couple of hours queuing on the freeway to cross a bridge.

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2 Major assumptions

The major assumptions of this study are:

1. In the absence of BART service commuters will choose the car with a vehicle occupancy of 1.2 passengers per car.
2. Drivers will choose the route that minimizes his/her travel time
3. Trip departure times will not change,

3 Data sources

Current traffic conditions and the travel demand data used in this study were collected from the following sources:

- PeMS: California performance measurement system (http://pems.eecs.berkeley.edu). Provides historic and real time loop-detector data to obtain:
  - current traffic volumes
  - bottleneck capacities.
- BART Origin-Destination data, provides:
  - additional vehicular traffic demand
- 511.org and SF Bay traffic info (www.sfbaytraffic.info): on-line traffic information to obtain:
  - location of East Bay bottlenecks
  - current traffic speeds
  - current delays

The sample consisted of the average weekday of 2003 and 2004.

4 Analysis

The methodology of the study consisted of the following tasks:

1. Gather current traffic information to estimate:
    a. Location of the bottlenecks
    b. Capacities of the bottlenecks
    c. Demand for the bottlenecks
2. Estimation of the additional demand due to transbay BART closure.
3. Assignment of additional demand to the route that minimizes travel time
4. Evaluation of delays

Table 1 shows the vehicular flow (in vehicles per hour) that the BART system would transfer to the transbay corridor.

Table 1: Number of extra car trips to the transbay corridor

Westbound		Eastbound	
time	**# of cars**	**time**	**# of cars**
7:00	9,183	16:00	6,076
8:00	11,249	17:00	10,726
9:00	5,990	18:00	9,862
total	26,422		26,664

Notice that these quantities roughly match the traffic flow currently observed on the Bay Bridge during the same time period. These trips were assigned to the route that would minimize the travel time of crossing the bay. Given the configuration of the Bay Area surface transportation network, the bottleneck of any alternative route is on one of the four bridges in Table 2. The capacity shown on the table corresponds to the maximum number of vehicles per hour that can cross each bridge per direction of travel.

Table 2: Capacity of Bay Area Bridges*

Bridge	Capacity
Bay Bridge	8300
Richmond Bridge	3500
San Mateo Bridge	4560
Dumbarton Bridge	5370

* **figures represent the maximum number of vehicles per hour that can cross each bridge per direction of travel**

5 Results

The analysis revealed that the Bay Bridge, the Richmond Bridge and the San Mateo Bridge will create queues that will spill back up to 26 miles upstream, with speeds as low as 8 m.p.h.; see Table 3.

Table 3: Queue length and speed on Bay Area bridges

	AM - Westbound		PM - Eastbound	
Bridge	**Maximum Queue Length (miles)**	**Speed in queue (m.p.h.)**	**Maximum Queue Length (miles)**	**Speed in queue (m.p.h)**
Bay Bridge	26	9	31	11
Richmond Bridge	14	10	12	10
San Mateo Bridge	12	8	10	8

Table 3 implies that queues will spill back to most of the East Bay street network in the morning, which could likely cause a complete gridlock with speeds as low as 2 or 3 m.p.h. The same is true for the San Francisco street network in the evening. In such a chaotic situation, it is likely that drivers will spend 1 or 2 hours to get on the closest freeway and then spend an extra couple of hours queuing at the speeds on Table 3 to cross a bridge.

Figure 1 presents the travel times faced by commuters on several corridors, which *does not consider the delay on this street network to get in the freeway*. As such, these figures are optimistic, as they do not include the gridlock on city streets.

Figure 1: Freeway Travel Times with and without BART